

AWS re:Invent

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SEC205

Meeting digital sovereignty requirements on AWS

David Woodhouse

Principal Engineer, AWS Digital Sovereignty
AWS

Luis Wang

Sr. Manager, Product Management, EC2
AWS



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Agenda

What is digital sovereignty?

Existing approaches in the market

Cloud benefits vs. sovereignty tradeoffs

AWS approach to digital sovereignty

Transparency and Assurance

Local Trusted Partners

Closing



What is digital sovereignty?

80%

of organizations in Europe considered digital sovereignty to be the highest priority for their boards.

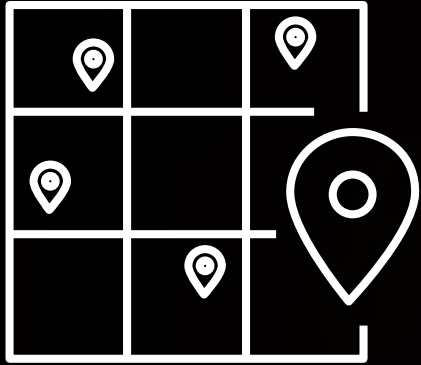
January 2022 IDC worldwide CEO survey

60%

of organizations in Europe believe digital sovereignty increases the cost of doing business globally.

Europe's Quest for Digital Independence, IDC, May 2022

Digital sovereignty



Data residency

I want to know where all my data is and control where that data is stored and transferred to at all times.



Operator Access Restriction

I want to be sure that neither AWS nor a foreign government can access my data in the cloud.



Resiliency and Survivability

I want to be sure that I can sustain operations despite any kind of foreign disruption and influence.



Independence

We want our digital industries and sectors to thrive and compete at the global level.

Three approaches in the market



On-Premise

Some customers are choosing to hold back innovation on global cloud platforms, stalling projects or deploying internally.



Hybrid

Some customers are splitting workloads across public cloud and on-premises.



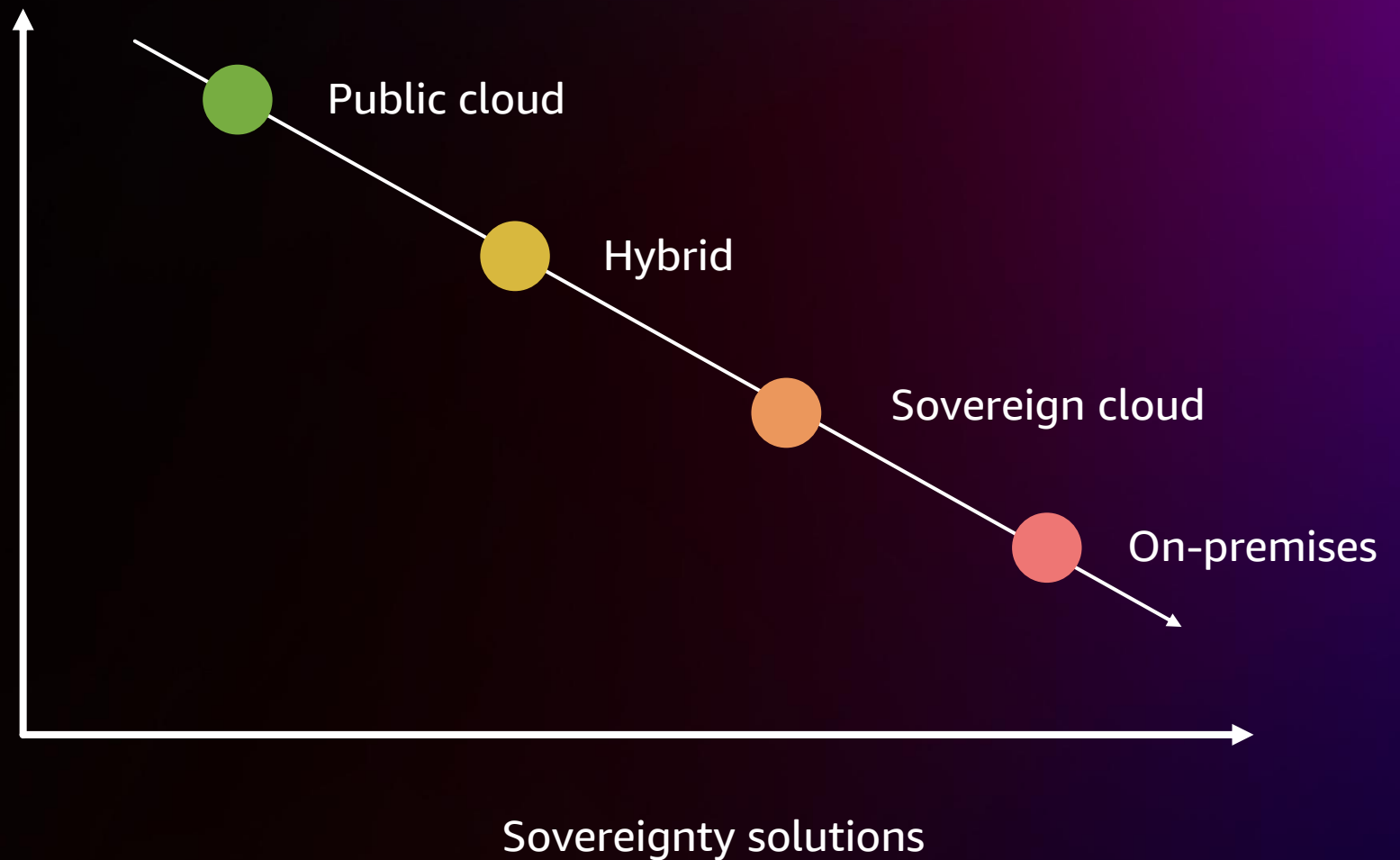
Sovereign Cloud

Some public cloud providers promise to deliver dedicated sovereign clouds in the future.

Cloud benefits vs. sovereignty solutions

Cloud benefits:

- Price
- Scalability
- Resiliency
- Elasticity
- Pace of innovation
- Security



**Customers want sovereignty
without compromising the full
breadth and depth of the cloud**

AWS Cloud is sovereign by design



**Data Residency
Controls**

**Transparency &
Assurances**

**Operator Access
Restriction**



**Sovereign
by design**

**Trusted Local
Partners**

**Encryption
Everywhere**

**Resiliency in
the Cloud**

Data residency



Largest global infrastructure footprint

410+

400+ Edge Locations and 13
Regional Edge Caches

96

Availability Zones

30

Launched Regions
Each with 3 or more
Availability Zones



AWS Control Tower

- **Preventive controls (service control policies)**

- Ensure that your accounts maintain compliance because controls disallow actions that lead to policy violations

- **Detective controls (now powered by AWS Security Hub)**

- Detect noncompliance and security risks in existing resources in line with AWS Foundational Security Best Practices

- **NEW! Proactive controls (CloudFormation Guard)**

- Policies are automatically enforced on all CloudFormation deployments

AWS Control Tower – data residency controls

Four

preventative guardrails

- Deny access to services and operations in selected AWS Regions
- Disallow internet access for an Amazon VPC instance
- Disallow Amazon Virtual Private Network (VPN) connections
- Disallow cross-Region networking for Amazon EC2, Amazon CloudFront, and AWS Global Accelerator

Thirteen

detective guardrails

- Range from detecting whether replication instances for AWS Database Migration Service (AWS DMS) are public to detecting whether any Amazon VPC subnets are assigned a public IP address
- Implemented via AWS Config

Single pane of glass via AWS Control Tower

The screenshot displays the AWS Control Tower Dashboard, which serves as a single pane of glass for managing AWS environments. The interface is divided into a left-hand navigation pane and a main content area.

Navigation Pane:

- AWS Control Tower** (selected)
- Dashboard**
- Organizational units**
- Accounts**
- Account factory**
- Guardrails**
- Users and access**
- Shared accounts**
- Landing zone settings**
- Activities**
- AWS Marketplace for Control Tower**
- See What's New in AWS Control Tower**
- View our AWS Control Tower Blogs**
- Launch solutions with the Getting Started library**
- Join our feedback panel**

Main Content Area:

Recommended actions

Environment summary

Metric	Value
Organizational units	9
Accounts	13

Enabled guardrail summary

Metric	Value
Preventive guardrails	24
Detective guardrails	7

Noncompliant resources

Resource type	Service	Region	Account name	Organizational unit	Guardrail
SecurityGroup	EC2	us-east-1	AWS_Storage_NameChange	DEVENV	Detect whether unrestricted internet connection through SSH is allowed
AWS::Account	-	eu-west-1	AAM-DEMO-ACCOUNT2	workloads_dev	Detect whether MFA for the root user is enabled
SecurityGroup	EC2	us-east-1	Dev-1	DEVENV	Detect whether unrestricted internet connection through SSH is allowed
AWS::Account	-	us-west-2	AAM-DEMO-ACCOUNT2	workloads_dev	Detect whether MFA for the root user is enabled
AWS::Account	-	eu-west-1	Test-Provision	workloads_dev	Detect whether MFA for the root user is enabled

Registered organizational units

Name	Parent organizational unit	State	Compliance
Core	Root	Registered	Compliant
Custom	Root	Registered	Compliant



AWS Digital Sovereignty Pledge

We will expand data residency controls for operational data, such as identity and billing information.

Operator access restrictions

Zero privilege operations

Data handling best practices

Categorizing types of data and training employees on secure data handling practices

Always-on accountability

Every action taken by any operator is securely recorded in a manner that cannot be evaded or deleted

Contingent authorization

No one person or system should be a single point of failure for security

Hermetic systems

No general purpose or interactive access, and by design no means to disclose data

AWS Nitro System

AWS Lambda

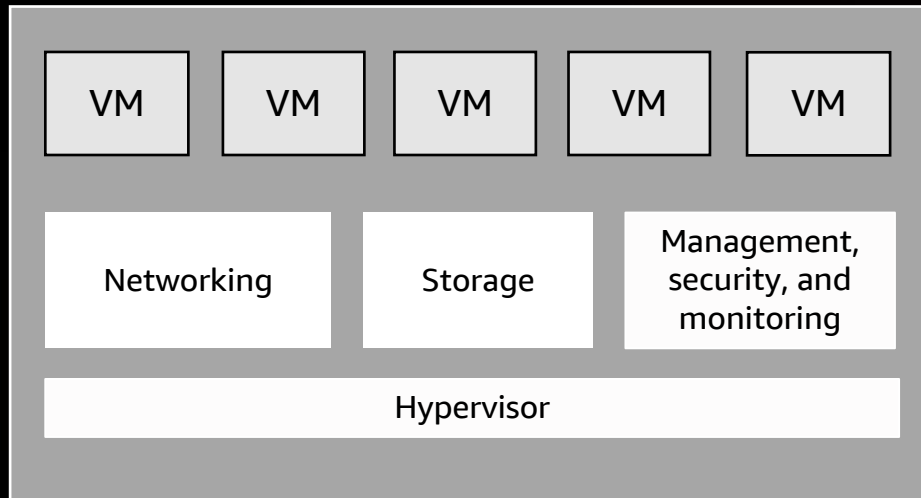
AWS KMS

ACM for Nitro Enclaves

AWS Nitro System

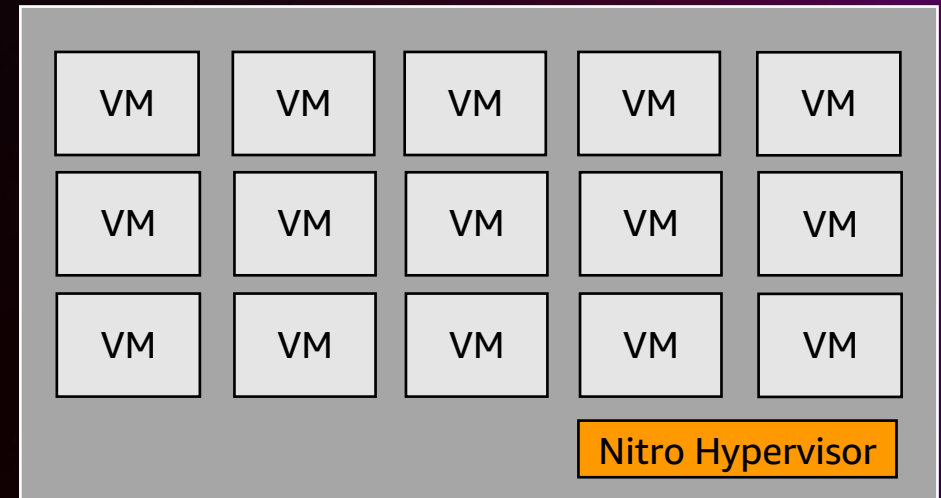


Reinventing virtualization for the cloud



Host

Classical virtualization



↑ Amazon EC2 host

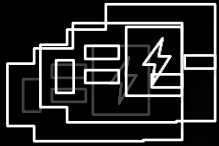


AWS Nitro System



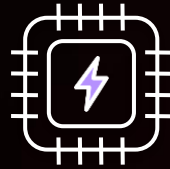
AWS Nitro System

Nitro Cards



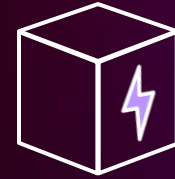
- Local NVMe storage
- Elastic block storage
- Networking, monitoring, and security

Nitro Security Chip



- Integrated into motherboard
- Protects hardware resources

Nitro Hypervisor



- Lightweight hypervisor
- Memory and CPU allocation
- Bare metal-like performance

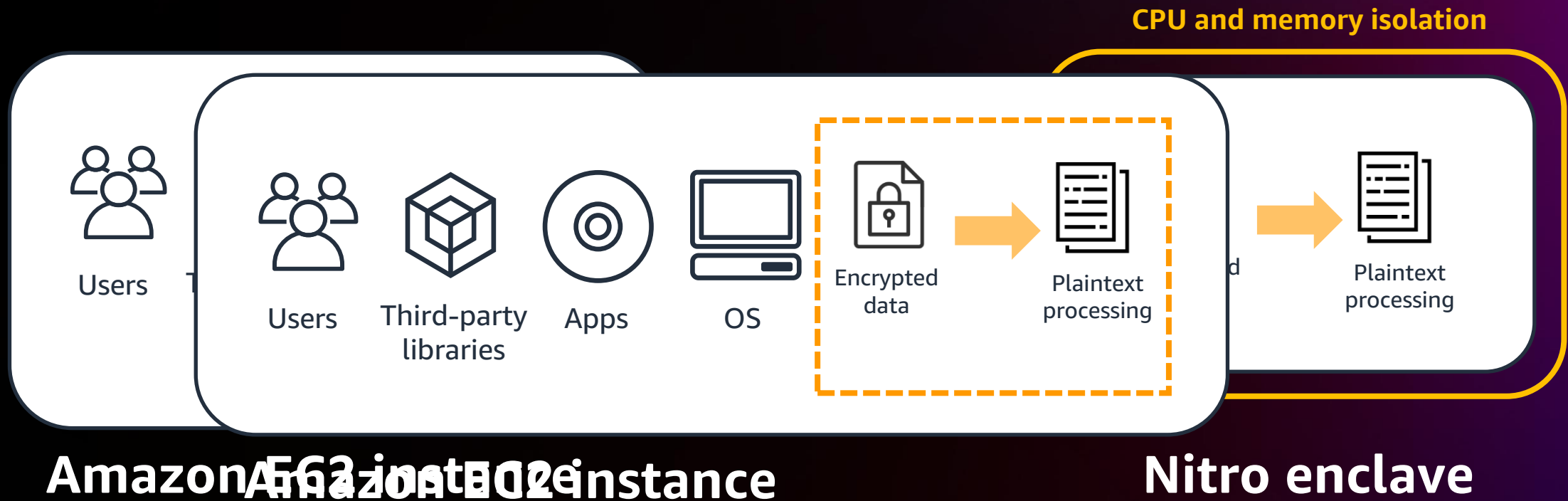
New! *The Security Overview of the AWS Nitro System* whitepaper

- Detailed review of the security design the three primary components of the AWS Nitro System:
 - Nitro Cards
 - Nitro Security Chip
 - Nitro Hypervisor
- Deep dive on the AWS Nitro System integrity protections, tenant isolation model, and no operator access design



<https://a.co/hYWhsH9>

What is AWS Nitro Enclaves?



Nitro Enclaves provides additional isolation for data in use

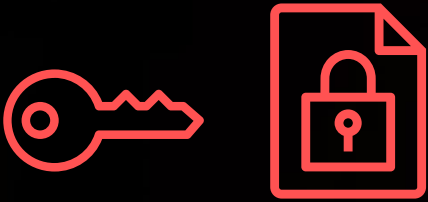
AWS Digital Sovereignty Pledge

We commit to continue to build additional access restrictions that limit all access to customer data unless requested by the customer or a partner they trust.

Encryption everywhere



Encryption everywhere



Ability to encrypt all your data, whether in transit, at rest, or in memory

All services support encryption. Most services support encryption with customer managed keys that are inaccessible to AWS



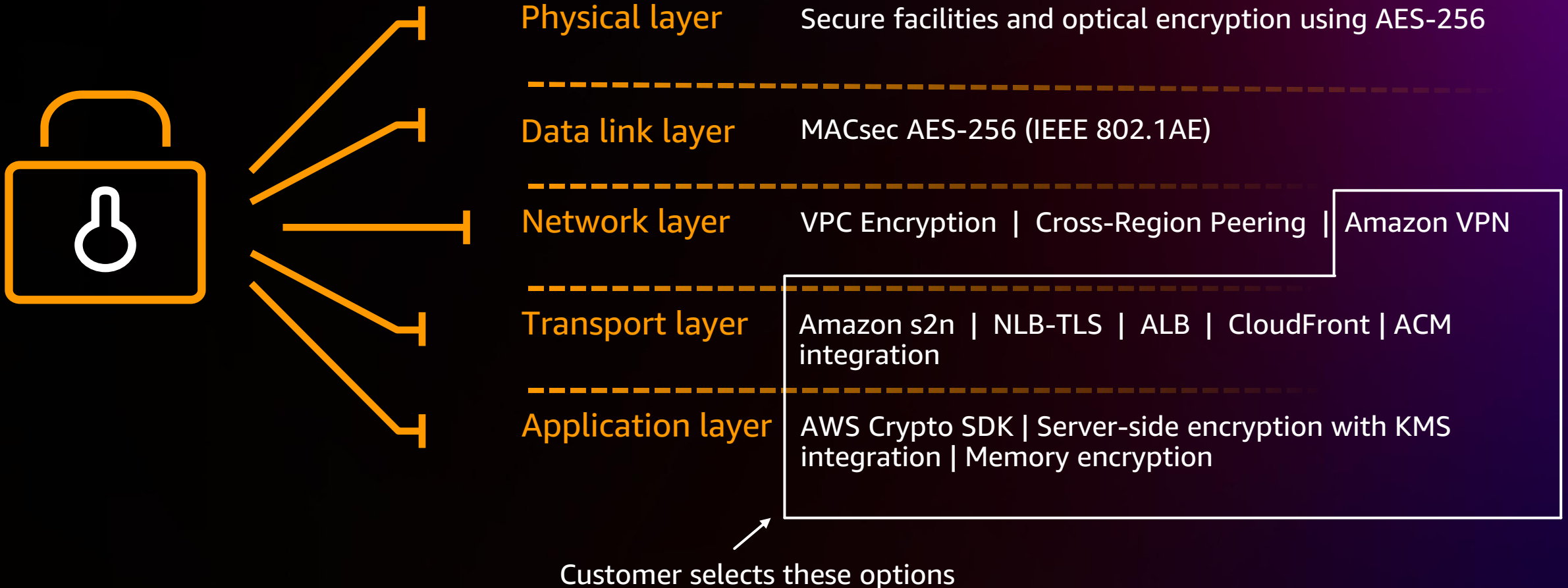
AWS Key Management Service (AWS KMS)



AWS CloudHSM

AWS KMS, CloudHSM and the **new XKS feature in KMS** provide customers the ability to manage their keys and encrypt all their data to meet regulatory requirements

AWS Cryptography Stack



What is AWS KMS?



- AWS KMS lets you create, manage, and control cryptographic keys across your applications
- Scales to any workload (50,000 TPS) with low latency and 99.999% public SLA
- All sensitive key operations protected inside FIPS 140 certified fleet of HSMs
- AWS KMS is incorporated in over 100 AWS services to encrypt sensitive data and create digital signatures

Can AWS see my keys?

- **Keys never exist in plaintext outside the HSM**
- **When operational with keys provisioned:**
 - No AWS operator can access the HSM (no human interfaces)
 - No software updates allowed (must tear down HSM to blank)
- **After reboot and in a non-operational state**
- No key material on host
- Software can only be updated after multiple AWS employees have reviewed the code
 - Under quorum of multiple AWS KMS operators with valid credentials
- Third-party evidence
- SOC 1 – Control 4.5: *Customer master keys used for cryptographic operations in AWS KMS are logically secured so that no single AWS employee can gain access to the key material*



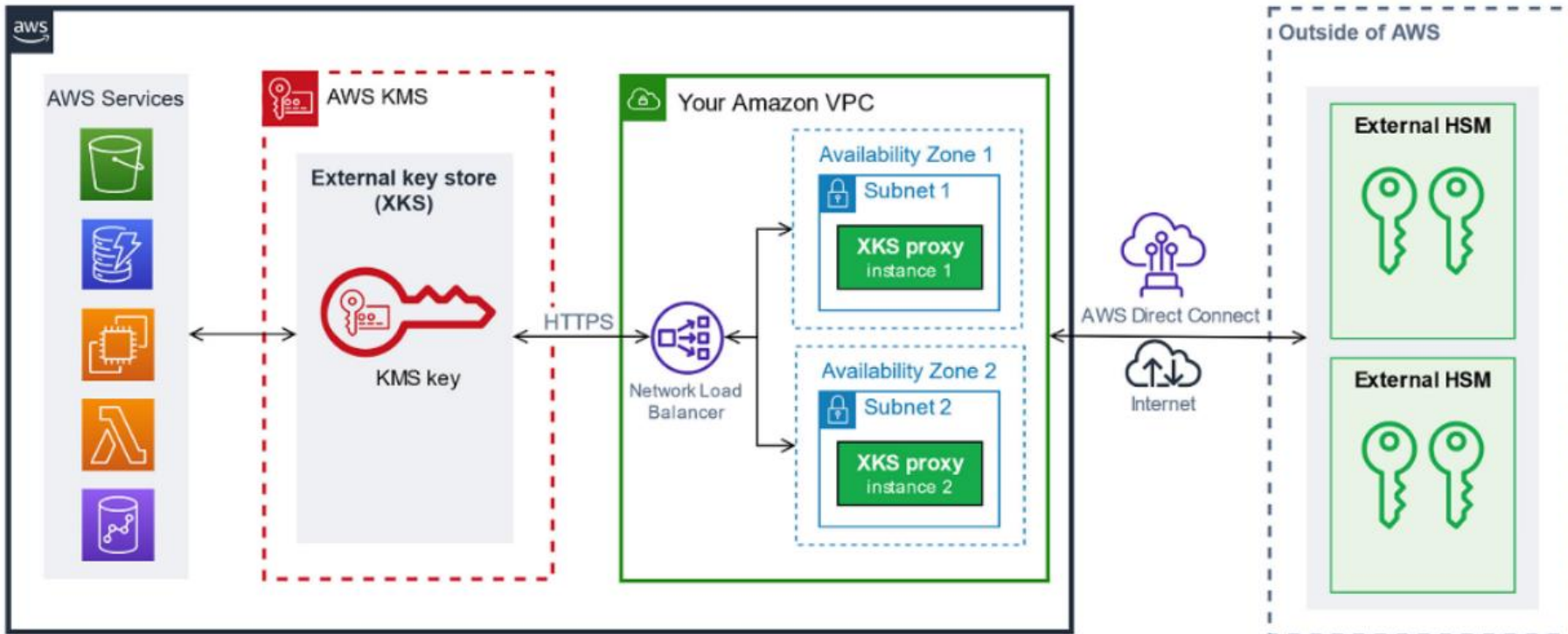
What is AWS CloudHSM?



- Standalone, dedicated HSM cluster that you own and operate in your VPC
- Extensive support to help “lift and shift” on-premise HSM workloads
- Offers more specialized cryptographic algorithms and legacy ciphers than KMS
- Certified at FIPS 140-2 Security Level 3
- Can become the backend HSM for KMS using the KMS custom key store feature

New! External Key Store (XKS)

XKS proxy in VPC using VPC connectivity



AWS Digital Sovereignty Pledge

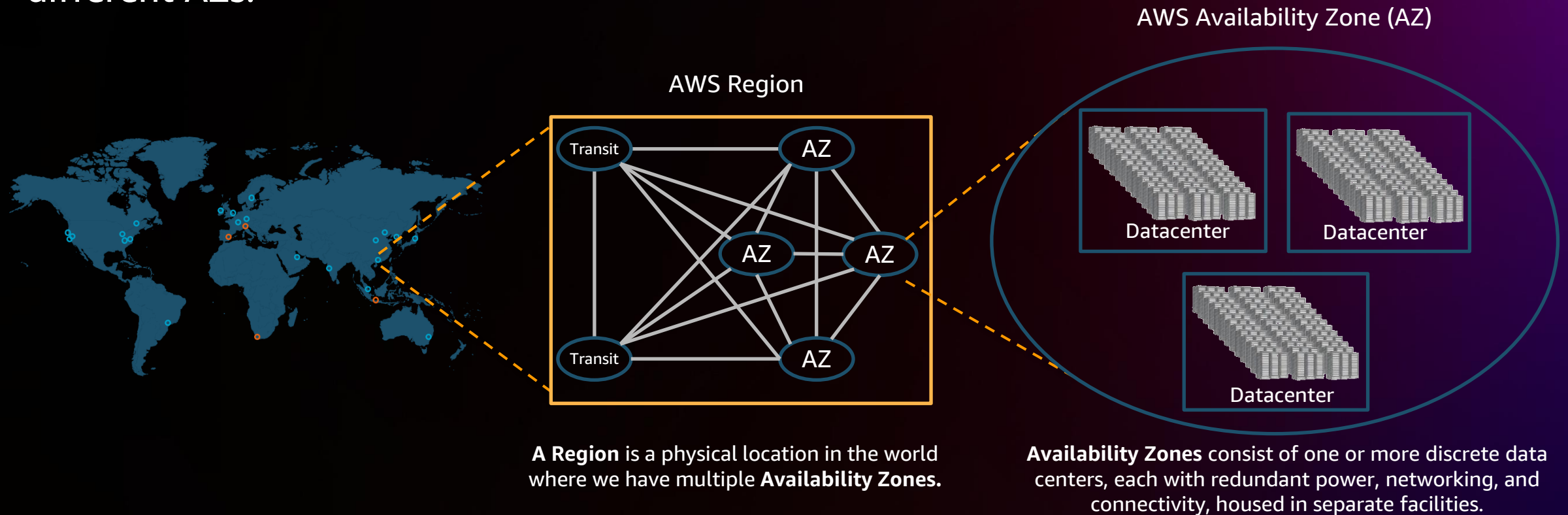
We commit to continue to innovate and invest in additional controls for sovereignty and encryption features so that our customers can encrypt everything everywhere with encryption keys managed inside or outside the AWS Cloud.

Resilience in the cloud



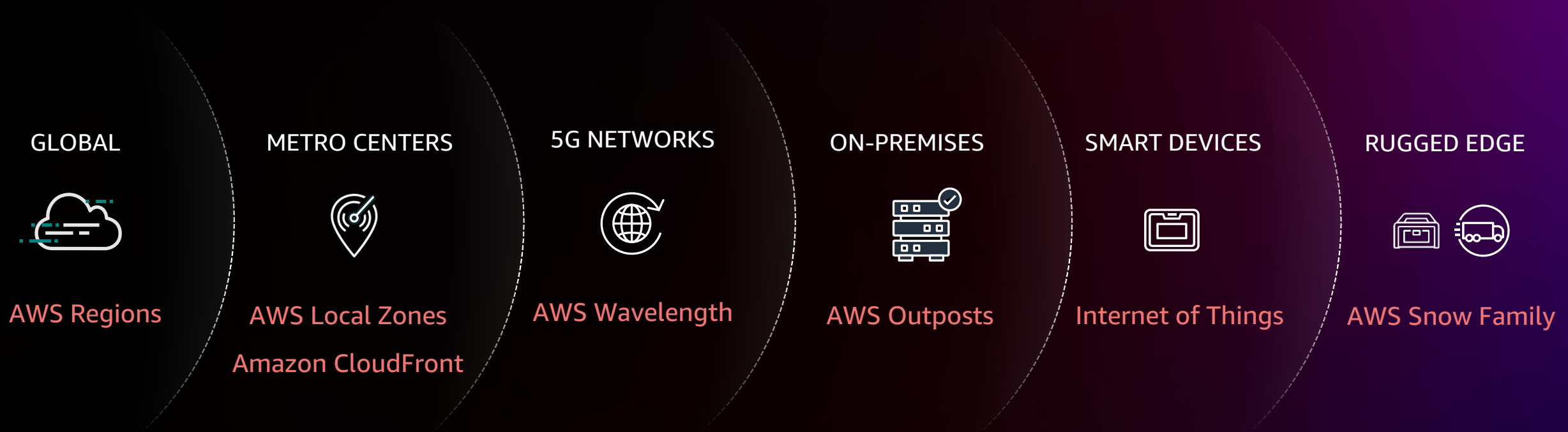
AWS Region design

AWS Regions comprise multiple AZs for **high availability**, **high scalability**, and high **fault tolerance**. Applications and data are replicated in real time and consistent in the different AZs.



Pushing the boundaries from the cloud to the edge

DELIVERING THE CLOUD ANYWHERE CUSTOMERS NEED IT



SAME INFRASTRUCTURE, SERVICES, APIS, AND TOOLS FOR A CONSISTENT EXPERIENCE



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AWS Regional Services

- 180+ AWS services are fully regionalized
 - They work autonomously in-region
 - Some services are intentionally global (CloudFront, Route 53, etc.)
- If you do not want to use specific regions:
 - Use AWS Organizations to deny access*
 - Regions introduced after March 20, 2019 are disabled by default and must be enabled manually**



AWS Digital Sovereignty Pledge

We commit to continue to enhance our range of sovereign and resilient options, allowing customers to sustain operations through disruption or disconnection.

Transparency and assurance

Certifications and attestations



Privacy features of AWS

AWS service	Customer can encrypt	Customer can delete	Customer can monitor processing	No remote access*
Alexa for Business	✓	✓	✓	✓
Amazon API Gateway	✓	✓	✓	✓
Amazon AppFlow	✓	✓	✓	✓
Amazon AppStream 2.0	✓	✓	✓	✓
Amazon AppStream 2.0 User Pools	✓	✓	✓	✓
Amazon Athena	✓	✓	✓	✓
Amazon Augmented AI (A2I)	✓	✓	✓	✓
Amazon Aurora	✓	✓	✓	✓
Amazon Braket	✓	✓	✓	✓
Amazon Chime	✓	✓	✓	✓
Amazon Cloud Directory	✓	✓	✓	✓
Amazon CloudFront	✓	✓	✓	✓
Amazon CloudWatch	✓	✓	✓	✓
Amazon CloudWatch Logs	✓	✓	✓	✓
Amazon CodeGuru Profiler	✓	✓	✓	✓

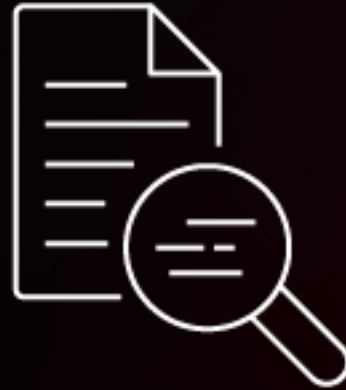
<https://aws.amazon.com/compliance/privacy-features/>



Contractual commitments



Challenge law enforcement requests that are overbroad, or where we have any appropriate grounds to do so, including where the request conflicts with EU law



Bi-annual Information Request Report describing the types and number of information requests AWS receives from law enforcement

0

No requests resulted in the disclosure to the U.S. government of enterprise content data located outside the United States since we started to collect this data in July 2020

AWS Digital Sovereignty Pledge

We commit to continuing to provide the transparency and business flexibility needed to meet evolving privacy and sovereignty laws.

Local Trusted Partners



AWS Partner Network and Programs

Authority to Operate (ATO)

Helps AWS Partners meet their customers' authorization needs, whether it be architecting, configuring, deploying, or integrating tools and controls

Data Protection as a Managed Service

In Germany, T-Systems (part of Deutsche Telekom) offers Data Protection as a Managed Service on AWS

AWS Managed Security Service Providers (MSSP)

Full outsourcing or integrate and join forces with your internal security teams to help you fully operationalize your AWS security

AWS ClearStart

In Sweden, AWS ClearStart helps public sector organizations to meet their security and regulatory needs through partners such as Atea, Capgemini, Cybercom, Nordcloud and SecureAppbox

AWS Security Competency Partners

Software and service engagements to help customers elevate their security in the cloud



AWS Digital Sovereignty Pledge

We are doubling down with local partners that our customers trust to help address digital sovereignty requirements.

Read our AWS Digital Sovereignty Pledge

Matt Garman, SVP at AWS



<https://aws.amazon.com/blogs/security/aws-digital-sovereignty-pledge-control-without-compromise/>



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Resources

Read our related blogs, whitepapers & other helpful online resources

Confidential computing: An AWS perspective

<https://aws.amazon.com/blogs/security/confidential-computing-an-aws-perspective/>

AWS achieves ISO27701 compliance

<https://aws.amazon.com/blogs/security/aws-achieves-iso-iec-27701-2019-certification/>

AWS cloud services adhere to CISPE code

<https://aws.amazon.com/blogs/security/aws-cloud-services-adhere-to-cispe-data-protection-code-of-conduct/>

AWS Contractual Agreements

<https://aws.amazon.com/blogs/security/aws-and-eu-data-transfers-strengthened-commitments-to-protect-customer-data/>

AWS Nitro Security Whitepaper

<https://a.co/hYWhsH9>

AWS Control Tower Data Residency Guardrails

<https://aws.amazon.com/about-aws/whats-new/2021/11/aws-control-tower-controls-data-residency-requirements/>

Visit Data Protection Hub | Data Protection and EU Data Protection webpages

Data Protection: <https://aws.amazon.com/compliance/data-protection/>

EU Data Protection: <https://aws.amazon.com/compliance/eu-data-protection/>

Visit our updated Data Privacy Center and GDPR Center

Data Privacy Center: <https://aws.amazon.com/compliance/data-privacy/>

GDPR Center: <https://aws.amazon.com/compliance/gdpr-center/>

Check out the updated Privacy features of AWS Services and sub-processor webpages for information on data transfers (customer content)

Privacy features: <https://aws.amazon.com/compliance/privacy-features/>

Sub-processor: <https://aws.amazon.com/compliance/sub-processors/>

Bi-annual Amazon Information Requests:

<https://www.amazon.com/gp/help/customer/display.html?nodeId=GYSDRGWQ2C2CRYEF>



Thank you!

David Woodhouse
dwmw@amazon.co.uk

Luis Wang
wangluis@amazon.com



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survey in the **mobile app**



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